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Treatment Of Distal Radius Fractures Using The Hk2 Technique About 210 Cases.

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Summary:
Fractures of the distal radius are very common and pose a public health problem. Their management represents a real challenge. We conducted a prospective descriptive study.
Two hundred and six patients, including four with bilateral involvement, were included in our study, which thus comprises 210 cases.
Ninety percent of our patients consulted us urgently, the most frequent mechanism being indirect impact by a fall on the hyperextended wrist, with the dominant limb affected in half the cases. Clinical examination is marked by deformity of the wrist, with most associated bone and soft tissue lesions located mainly on the homolateral upper limb.
X-rays of the wrist from the front and side allow analysis of metaphyseal, epiphyseal and ulnar lesions, and to search for associated lesions. After fracture reduction, stabilization was performed using the GERARD HÖEL HK2 pinning technique.
Keywords: *distal radius fractures, Intrafocal cross-pinning HK2, osteoporosis, prospective and descriptive study.*

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I. Introduction:

Fractures of the distal radius remain the most frequent fractures in traumatology [1,18,20,21].
They account for 75% of all fractures of the antebrachial segment [5].

They are often complex lesions involving, to varying degrees, the radial metaphysis, radial epiphysis and distal ulna [18].
They constitute a real public health problem, occurring at any age.
Surgical treatment of these fractures has been on the rise for decades, but remains controversial [24].

This prospective, descriptive study comprises a series of 206 patients (210 cases, as 04 patients were bilaterally involved) operated on by pinning using Gerard Höel's HK2 pinning technique [12,13].

II. Material And Methods:

Two hundred and six patients, aged between 15 and 83 years, including four with bilateral involvement, were included in our study, which thus comprises 210 cases.

In 90% of cases, our patients consulted us in an emergency. The most frequent mechanism was indirect impact by a fall on the hyperextended wrist, and the dominant limb was affected in half the cases. Clinical examination is marked by deformity of the wrist, with most associated bone and soft tissue lesions located mainly on the homolateral upper limb.

X-rays of the wrist from the front and side allow analysis of metaphyseal, epiphyseal and ulnar lesions, and to search for associated lesions. After fracture reduction, stabilization was performed using the GERARD HÖEL HK2 pinning technique[Fig.01]. Patients were reviewed at 1 week, 3 weeks, 6 weeks, 3 months and 6 months. At each visit, patients were assessed using Castaing scores derived from Gartland and Werley, and a front and side X-ray of the wrist was taken.

Emergency management was 87.6%. Local and locoregional anesthesia was used in 92.4% of cases. Irradiation time did not exceed 30 seconds in 94.7% of cases. In the majority of cases, our patients were not immobilized post-operatively. Early mobilization of the fingers and early functional rehabilitation after removal of the pins, as soon as consolidation was achieved, at 6 weeks.

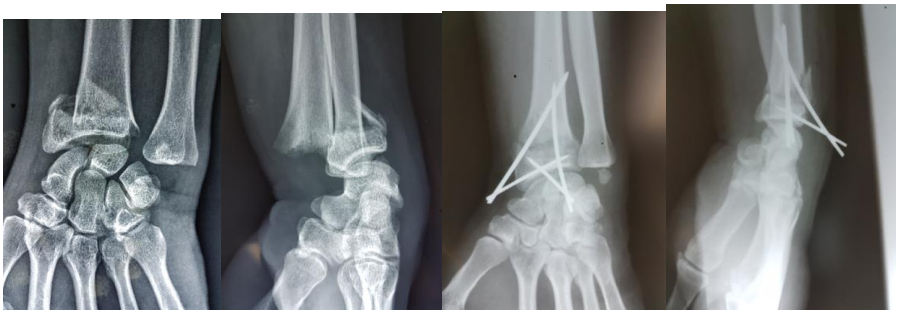

Fig.01

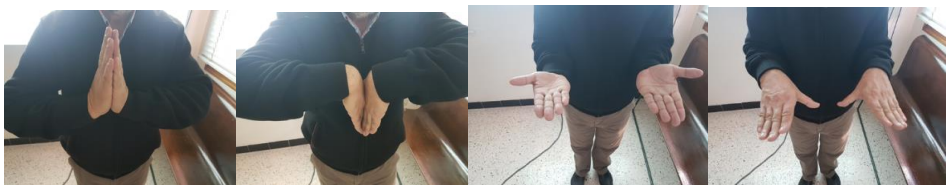

Fig.02

III. Results:

The mean follow-up period was 20 months, and the mean age was 50.5 ±14.7 years, with a minimum of 15 years and a maximum of 94 years.

In our series, females are more affected than males: up to the age of 40, the incidence of distal radius fractures is higher in males; beyond this age, the incidence increases in females.

The left side is more affected, and comorbidities include hypertension, heart disease and diabetes.

The incidence of osteoporosis, a predisposing factor, is 7% in our series.

The mechanism involved is mainly indirect, with the wrist in hyperextension, found in 95% of cases; the indirect mechanism, with the wrist in flexion, is found in 1% of cases.

Direct impact is rare, occurring in 4% of cases.

Domestic accidents are the most frequent in our series, involving low-energy trauma following minimal trauma. Other etiologies are characterized by the velocity of the trauma, especially in young subjects.

Joint involvement was absent in 44.3% of cases. Ulnar involvement was found in 45.7% of cases.

Secondary postoperative complications in order of increasing frequency are:

- Tendinous: 2 cases;
- Nervous: 2 cases;
- Pin migration: 4 cases;
- Infectious: 4 cases;
- Secondary displacement: 7 cases;
- Algo dystrophy: 10 cases

Late postoperative complications, in ascending order of frequency, were as follows:

- Stiffness: 2 cases
- Callus: 2 cases
- Ulnar pain: 5 cases [24,25,27].

IV. Discussion:

Blocked intrafocal pinning is a rapid, inexpensive and reproducible technique, enabling immediate mobilization and rapid return to independence.

Our study concerns 206 patients with 4 bilateral fractures, representing a total of 210 cases of distal radius fracture. Our patients were operated on using the HK2 technique.

The average follow-up was 20 months. In the literature, the mean follow-up time ranges from 6 months to 5 years. In fact, an average follow-up of one year is sufficient to judge the outcome of distal radius fracture treatment [22].

Fractures of the distal radius are the most frequent in traumatology, and their incidence is rising sharply. This fracture affects all age groups, with a predominance in post-menopausal women [18,29], but with an increase in young adults, following traffic and sports accidents [9,30].

HOEL's series found a mean age of 49 years, with a predominance of women [13].

There is a predominance of low-energy domestic accidents involving a simple fall on the hand, due to increased osteopenia [28].

Their instability justifies surgical stabilization. There is no standard fixation system, as shown by the diversity of osteosynthesis and immobilization techniques found in the literature [10,22 ,25,31,32,33].

The HK2 stabilization method uses non-threaded pins. Absorbable, threaded, intrafocal, centromedullary wires are available, which bridge the fracture site. [13,22]

In our series, intrafocal anesthesia and plexus block were used in the outpatient management of distal radius fractures. A review of the literature shows that intra-focal anaesthesia results in a significant reduction in post-reduction pain, with a mean VAS of 1.5, while the quality of reduction is no different with other anaesthetic methods [17].

-The duration of the operation is an important criterion in terms of health and economics.

- Maire et al. used pneumatic tourniquets in HK2 pinning.

-Some authors recommend immobilization with a simple orthesis, while others prefer a brachio-palmar cast and others no immobilization at all [6,13,16,22].

-In Maire's series, hardware removal was performed under locoregional anaesthesia, as the intrafocal pins were threaded and therefore uncomfortable to remove under local anaesthesia [22].

- In our series, the wires were removed without anaesthesia, as the wires used did not have the same diameter.

There is a peak age between 45 and 55 years, and a predominance of women, in line with the greater osteoporotic state of women following the menopause [22].

A fracture of the distal end of the ulna is a factor which has a direct influence on treatment. It requires double stabilization of the distal forearm and postoperative immobilization of the distal radius fracture (elbow immobilization essential) [11,36].

In our series, the associated ossicular lesions were operated on during the same operation, as is done for polyfractures.

The associated non-displaced scaphoid fracture, found in one case of bilateral involvement, was stabilized during the same operation by percutaneous pinning. [1,7,34,38].

It has now been demonstrated that pinning should ideally be intra- and extra focal, using 18/10 or 20/10 pins. HK2 type pinning meets this requirement [26].

A similar study found better results at 6 weeks with a combination of intra- and extra focal pins in controlling ulnar variance [26].

The most frequent complication of pinning techniques in general, and intrafocal pinning in particular, is secondary displacement, with rates ranging from 10% to 30% [2,18,19,23,34].

In our series, secondary displacement occurred in 3.4% of cases.

In his series of 35 cases, HOËL had no secondary displacement [13].

In Maire's series, blocked intrafocal pinning resulted in 8.7% of secondary displacements.

According to this author, this low rate could be explained by the attachment of intrafocal wires to subchondral wires, in the manner of an external fixator.

The subchondral pin acts like the subchondral screws of locked anterior plates [22].

Hyperreduction is a classic complication of the treatment of fractures of the distal end of the radius osteosynthesized by pinning. [2,3,4,15].

The frequency of type I complex regional pain syndrome (algodystrophy) varies from 4% with locked plates to 10% with pins. This high rate can be explained by long immobilization periods of 3 to 6 weeks [23,27].

- In our series, this complication occurred in 4.8% of cases. This rate can be explained by early mobilization thanks to the stability of the HK2 system.

Algodystrophy is frequent, and is the main cause of functional sequelae and patient dissatisfaction at 1 year [18].

Several studies emphasize the importance of immediate rehabilitation, as the only way to ensure rapid recovery of mobility and limit the risk of algoneurodystrophy[8,14 ,37].

The overall complication rate in our series was 18.1%; in other series:

Delattre: 28.5%, Strohm: 38%, Dowdy:11.8, Marcheix:15% [23].

V. Conclusion:

Type HK2 pinning can be used to treat most distal radius fractures. The treatment delivers satisfactory clinical Fig.02, radiological and functional results.

This new procedure is simple, space-saving, economical and suitable for the elderly.

The clinical and radiological results of this technique, which does not require a major approach, are promising.

It opens the way to the management of distal radius fractures in all age groups. Its indications are manifold and can be extended to open fractures and in cases of pre-existing skin lesions [12].